

II. NOTES ON THE TYPE SPECIMENS OF SOME BURMESE AND HIMALAYAN RATS.

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The authorities of the Indian Museum have recently lent me for examination the types of some long-described species in the collections at Calcutta, and these slight notes on some little-known animals and little-studied material may be of use to workers on Eastern mammals.

Rattus bowersi (Anderson).

Mus bowersi, Anderson, *Anat. and Zool. Res.*, p. 304, pl. xvii (1878); Thomas, *P.Z.S.*, 1886, p. 62; Sclater, *P.Z.S.*, 1890, p. 524, pl. xlv, fig. 2; *id.*, *Cat. Mamm. Ind. Mus.*, II, p. 62 (1891); Thomas (*partim*), *Ann. Mus. Civ. Gen.* (2a), X (XXX), p. 937 (1892).
Epimys bowersi, Thomas, *Journ. Bombay Nat. Hist. Soc.*, XXIV, p. 410 (1916).

The type is an adult female with slightly worn teeth collected by Anderson at Hotha, Kakhyen Hills, near Bhamo, Upper Burma. The body, which is preserved in alcohol, no longer serves to indicate the colour of the animal in life but shows that the pelage is of the same hispid type as in *R. berdmorei* (Blyth) and *R. ferreocanus* (Miller),¹ being composed of long, slender spines or bristles and a much softer under-fur.

The skull is in poor condition, as both the zygomata and the whole of the left side of the palate and tooth-row are broken, while the tips of all the incisors are much chipped. The species, however, is now well-established and a good number of specimens are available for examination in the South Kensington and Genoa Museums.

Mr. Thomas (*Journ. Bombay Nat. Hist. Soc.* XXIV (1916), p. 409) has forestalled me in a comparison of this species with *R. ferreocanus* of the Malay Peninsula: while, however, he had at his disposal numerous specimens of *bowersi* but only one of *ferreocanus*, there are available to me, on the contrary, several examples of the latter in the collections of the Federated Malay States Museums, but only the type of *bowersi*.

Thomas states that *bowersi* is larger, having a greatest length of skull of 55—57 mm., while that of *ferreocanus* is about 53 mm. One of three adults skulls of the latter, however, measures 55.5, so it is not impossible that when a larger series is available we shall

¹ *Proc. Biol. Soc. Washington*, XIII, p. 140, pls. iii, iv, fig. 2 (1900); type from Trang, Peninsular Siam.

find that there is not the difference in size at present believed, The skulls of both are of the same elongate form, only slightly curved above from front to back,¹ but the bullae of *bowersi* are considerably larger and more dilated than those of *ferreocanus*: on the other hand the molars are smaller (both shorter and narrower), the alveolar lengths of the upper tooth-rows being respectively 8·7 and 9·4 in skulls of equal length. In the type of *bowersi* the incisors are light orange-yellow; in *ferreocanus* they are ivory with pure white tips. The latter, though a member of the *bowersi* group and representing it in the Malay Peninsula, appears to be a well-marked and distinct species.

Some measurements of the type skull of *bowersi* are:—greatest length, 54·0; condylo-basilar length, 47·8; basilar length, 44·7; palatilar length, 25·2; length of palatal foramina, 9·0; diastema, 17·0; upper tooth-row (alveolus), 8·7; nasals, 20·7×5·3; inter-orbital breadth, 8·0; greatest cranial breadth, 21·3.

2. *Rattus berdmorei* (Blyth).

Mus berdmorei, Blyth, *Journ. Asiat. Soc. Bengal*, XX, p. 173 (1851);
id., *op. cit.*, XXIII, p. 343 (1863); Selater, *P.Z.S.*, 1800, p. 524;
id., *Cat. Mamm. Ind. Mus.*, II, p. 71 (1891).
Epinys berdmorei, Thomas, *Journ. Bombay Nat. Hist. Soc.*, XXIV, p. 413 (1916).

All that remains of the type of this species, which was obtained by Berdmore at Mergui, Tenasserim (and which is still unique), is a portion of the skull including the zygomata to their posterior roots and possessing above the greater part of the parietals, but lacking below the bullae and basioccipital, etc.

I am glad to find that Thomas (*l.c.s.*) shares my opinion that this species possesses the same large bullae as my *R. b. magnus* of South-Eastern Siam (*P.Z.S.*, 1916, pp. 57-61, text-figure 1, where details and measurements of the skull of *berdmorei* are also given). The mandible has disappeared but the upper incisors are of similar colour to those of *bowersi* and show the same lack of curvature.

3. *Rattus rattus robustulus* (Blyth).

Mus robustulus, Blyth, *Journ. Asiat. Soc. Bengal*, XXVIII, p. 294 (1859); *id.*, *op. cit.*, XXXII, p. 343 (1863).
Mus rattus var. *D. rufescens*, Selater, *Cat. Mamm. Ind. Mus.*, II, p. 66 (1891).

The type of this form, an adult male with slightly worn teeth obtained by Berdmore at Schwegyin, Tenasserim, is a spirit specimen with a practically perfect skull.

It shows the following external dimensions:—head and body, 163 (approx.); tail 153 (possibly slightly imperfect); hind-foot, 33·5; ear, 19·5.

¹ Selater's figure is excellent; Miller's (*loc. cit.*, fig. 4) I regard as less satisfactory.

The colour of the pelage has been discharged and altered by spirit, but the fur of the undersurface was apparently white with a grey base and the hands and feet were white.

I am unable to say how the skull compares with other Indo-Chinese forms of *rattus*, but it is quite distinct from those of Central and South-east Siam or of the Malay Peninsula. The upper profile is less curved, the rostrum is lighter but longer and the bullae are much smaller and much less dilated, while the tooth-row, diastema and palate seem longer. As compared with two scarcely adult examples of "*rattus*" from Calcutta (the only Indian material to hand) the skull though of larger size with broader palatal foramina has again much smaller and more constricted bullae.

Measurements of skull: greatest length, 45·8; condylo-basilar length, 40·2; basilar length, 37·5; palatilar length, 21·8; palatal foramina, 8·9 × 3·3; diastema, 12·5; breadth of palate between anterior roots of m^8 , 5·9; length of upper tooth-row (alveolar), 7·3; upper edge of ante-orbital foramen to tip of nasals, 15·9; nasals, 18 × 3·8; inter-orbital breadth, 6·5; zygomatic breadth, 21·0.

It is not easy to understand how Blyth subsequently (*J.A.S.B.*, XXXII, 1863, p. 342) considered this animal to be the same as his *Mus berdmorei*.

4. *Rattus concolor* (Blyth).

Mus concolor. Blyth, *Fourn. Asiat. Soc. Bengal*, XXVIII, p. 295 (1859); *id. op. cit.*, XXXII, pp. 74, 344 (1863); Sclater, *P.Z.S.*, 1890, p. 526, pl. xlv, figs. 3, a, b, c (1890); *id.*, *Cat. Mamm. Ind. Mus.*, II, p. 68 (1891).

The types of this species, three specimens collected by Berdmore at Shwegyin, Tenasserim, and preserved in alcohol, are unsatisfactory. Specimen (*e*) of Sclater's catalogue is apparently adult though the teeth show no signs of wear, (*f*) is smaller than (*e*) and sub-adult with teeth quite unworn, while (*g*) is a juvenile. As the skull of (*e*) is unfortunately badly crushed I select the female specimen (*f*) as lectotype; for the skull figured by Sclater (*l.c.s.*) is evidently not one belonging to a member of the type series, but to some much larger individual. The skull (*f*) is complete and is in good condition except that the right parietal region is crushed inwards.

No colour details are available owing to long immersion in spirit.

Measurements of specimen (*f*):—head and body about 100 (108)¹; tail, 112 (131); hind foot, 23·3 (25); ear, 13·6 (15).

Skull: greatest length, 29·0; condylo-basilar length, 25·0; basilar length, 23·0; palatilar length, 13·2; length of palatal foramina, 5·6; diastema, 7·5; length of upper tooth-row (alveolar), 4·9; length of nasals, 10·4; inter-orbital breadth, 4·5; zygomatic breadth, 14·2.

Measurements in parentheses are those of the male individual (*e*).

5. *Rattus blythi*, nom. nov.

Mus cinnamomeus, Blyth, *Journ. Asiatic Soc. Bengal*, XXVIII, p. 294 (1859); *id.*, *op. cit.*, XXXII, p. 341 (1863).

Mus fulvescens, Thomas (*partim*), *P.Z.S.*, 1881, p. 537; Sclater, *P.Z.S.*, 1890, p. 524; *id.*, *Cat. Mamm. Ind. Mus.*, II, p. 69 (1891).

Mus cinnamomeus, Blyth, was described from two individuals collected by Berdmore at Shwegyin, Tenasserim, one of which has been mounted while the other is a skin in alcohol: both are accompanied by somewhat damaged skulls.

I propose to regard specimen (*a*) of Sclater's catalogue as the type for Blyth's name; for the measurements given by him, in his first account, were obviously made on a skin, while it is highly improbable that the colours he gave were recorded from the spirit specimen when another was available.

The mounted individual is in poor condition, the ears are very imperfect and the entire tail is missing.

The absence of the latter is unfortunate; for apart from the greater size of the animal, the impression conveyed by its pelage is that it is a member of the *cremoriventer* group,¹ distinguished by the slightly pencillate, unicoloured tail (of which a large form, *E. tenaster*, has recently been described by Thomas from Mt. Muleyit, Tenasserim, 5000 ft.).² On the whole the spines of the dorsal pelage are much slenderer than those of *cremoriventer* but a few are present which approach them in breadth and stiffness.

The skull, with teeth only slightly worn, closely resembles those of aged examples of *cremoriventer* and appears to differ only in narrower, less spatulate nasals and broader ante-orbital plates: the bullae are quite of the "*jerdoni*" type—small, flattish and but little dilated.

The upper incisors are, however, much more curved backwards and both pairs are *ivory-white* with no tinge of orange on the exposed portion—a character quite unknown in any rats of this section. On account of these features I think we must regard this rat as an example of a distinct species, and since the name *cinnamomeus* is preoccupied (Pictet, *Nol. Anim. Nouv. Mus. Gen.*, 1844, p. 64, pl. xix) I propose to call it *blythi* after its first describer.

The pelage was said to have originally the upper parts as bright, or scarcely less so, as the British dormouse; of a fine cinnamon colour with inconspicuous black tips, the under parts white abruptly divided from the cinnamon hue above. Length of head and body about 152; tail, 197; hindfoot, 32 mm.

The colour of the dorsal fur to-day is perhaps best described as somewhat between the "ochraceous-orange" and "ochraceous-tawny" of Ridgway³ and grey at the base. The pure white

¹ Miller, *Proc. Biol. Soc. Washington*, XIII, p. 144, pl. v, figs. 2, *a, b, c* (1900).

² Thomas, *Ann. Mag. Nat. Hist.*, (8) XVII, p. 425 (1916).

³ *Colour Standards and Nomenclature*, 1912.

undersurface is sharply margined and extends down the inner and posterior sides of the fore-limbs on to the hands: the front and inner sides of the thighs are white also, but the white feet are isolated by a "cinnamon" band round the ankles, which colour also extends slightly down the median line of the metapodials.

Some measurements of the skull are:—greatest length about 38.0; palatilar length, 15.4; length of palatal foramen, 6.4; diastema, 9.4; upper tooth-row (alveolus), 6.0; nasals, 13.9 × 3.9; palatal breadth between last molars, 4.8.

6. *Rattus jerdoni* (Blyth).

Leggada jerdoni, Blyth, *Journ. Asiat. Soc. Bengal*, XXXII, p. 350 (1863).

Mus jerdoni, ? Thomas (*partim*), *P.Z.S.*, 1880, p. 537; Sclater (*partim*).

P.Z.S., 1890, p. 525; *id.*, (? *partim*), *Cat. Mamm. Ind. Mus.*, II, p. 69 (1891).

Epimys fulvescens, Wroughton, *Journ. Bombay Nat. Hist. Soc.*, XXIV, p. 427 (1916).

The type of Blyth's *Mus jerdoni* (specimen *m* of Sclater's catalogue) was collected at Darjeeling by Jerdon, and is in a very bad state of preservation. The skin has been mounted and is now much torn and discoloured with the tail broken. The skull, which appears to have been removed later, consists of little more than the anterior portion; one zygomatic arch is complete, though fractured, but the tips of the nasals are broken away. The mandible is in fair condition.

The skull is that of a very young animal as only the first two molars are in sight. The combined lengths of these two molars, upper and lower as far as they show, are 5.0 and 4.8 mm. respectively.

The colour was described by Blyth as being "bright dark ferruginous above, pure white below; some fine long black tips intermingled among the spines of the back; limbs marked with blackish externally; the feet white. Length about 102; tail, 76; hindfoot 22 mm."

It was originally therefore much darker in colour than *fulvescens*, "*cinnamomeus*," etc., but not greyish like *niveiventer*. The colour to-day is very near Ridgway's "*cinnamon-brown*" on the back, becoming "*ochraceous-tawny*" on the lower parts of the sides (the base of the fur, as usual, grey) and one does not receive the impression that the darkish tone is due to immaturity only. The distribution of white on the underparts is as I have noted in the case of Blyth's "*cinnamomeus*."

On the rump the darker-tipped, pale spines are slender and elastic but they are stiff and flattened on the sides and mid-body. *The outer sides of the ears are very thickly clad with comparatively long hair of the same colour as the head.* The tail appears to have been bicoloured as stated by authors subsequent to Blyth; it is clad with very fine short hairs.

Thomas in 1886 (and other writers have followed him) held that *jerdoni* could always be separated from *fulvescens* on account

of its bicoloured tail, whereas in the latter the lower side was of the same tone as the upper: but quite recently Wroughton (*l.c.s.*) has come to the conclusion that *jerdoni* must be identical with *fulvescens* of which, therefore, it would be a synonym. I do not think, however, that we can yet take this as proved.

Associated with *jerdoni* by Sclater is a skull with much worn teeth from Darjeeling (specimen (*a*) of his catalogue). It most resembles the skulls of *cremoriventer* and of the type of "*cinnamomeus*" but is longer and relatively narrower with a rather long, pointed rostrum; the incisors are orange-coloured and are just a trifle more curved than those of the former. Available dimensions are:—greatest length, 40·0; condylo-basilar length, 32·8; basilar length, 30·3; palatilar length, 16·4; palatal foramina, 6·9×2·9; diastema, 10·0; upper tooth-row (alveolar), 6·3; palatal breadth between last molars, 4·3; posterior edge of ante-orbital foramen to tip of nasals, 13·2; nasals 15·3×4·5; inter-orbital breadth, 6·0; zygomatic breadth about 16·5; cranial breadth, 15·0.